What Is Claimed Is:

1. A therapeutic agent for combating Alzheimer's disease, wherein said agent can replace or supplement α_2M function, or suppress expression of *A2M-2*.

2. An anti-LRP-Aβ molecule comprising, an Aβ binding domain, and an LRP binding domain, or a pharmaceutically acceptable salt thereof.

3. The anti-LRP-Aβ molecule of claim 2, wherein said molecule is a peptide, or a pharmaceutically acceptable salt thereof.

4. An anti-LRP-Aβ peptide comprising:

(a) an Aβ binding domain comprising 10-50 contiguous residues of SEQ ID NO:6; and

(b) an LRP binding domain comprising 10-50 contiguous residues of SEQ ID NO:8, wherein said 10-50 contiguous residues of SEQ ID NO:8 encompass residues 1366-1392, or a pharmaceutically acceptable salt thereof.

5. An anti-LRP-Aβ peptide comprising:

(a) an Aβ binding domain having an amino acid sequence selected from the group consisting of SEQ ID NO:6, SEQ ID NO:12, SEQ ID NO:16, SEQ ID NO:18, SEQ ID NO:20, SEQ ID NO:22, SEQ ID NO:24, and SEQ ID NO:26; and

(b) an LRP binding domain having the amino acid sequence of SEQ ID NO:10, or a pharmaceutically acceptable salt thereof.

6. An anti-LRP-Aβ peptide comprising:

(a) an Aβ binding domain having an amino acid sequence selected from the group consisting of SEQ ID NO:12, SEQ ID NO:16, SEQ

ID NO:18, SEQ ID NO:20, SEQ ID NO:22, SEQ ID NO:24, and SEQ ID NO:26; and

(b) an LRP binding domain comprising 10-50 contiguous residues of SEQ ID NO:8, or a pharmaceutically acceptable salt thereof.

7. The anti-LRP-Aβ peptide of claims 4, 5 or 6, wherein said Aβ binding domain is connected to said LRP binding domain by a peptide bond.

8. The anti-LRP-Aβ peptide of claims 4, 5 or 6, wherein said Aβ binding domain is connected to said LRP binding domain by a linker.

9. The anti-LRP-Aβ peptide of claim 8, wherein said linker is selected from the group consisting of a peptide, or polyethylene glycol.

10. The anti-LRP-Aβ peptide of claims 9, wherein said peptide comprises 1-20 glycine residues.

11. A nucleic acid comprising a polynucleotide encoding the anti-LRP-Aβ peptide of claims 4, 5, 6, 7, 8, 9 or 10.

12. An anti-LRP-Aβ peptide comprising a polypeptide having the sequence of SEQ ID NO:14, or a pharmaceutically acceptable salt thereof.

13. An anti-LRP-Aβ peptide comprising:

(a) an Aβ binding domain having an amino acid sequence selected from the group consisting of SEQ ID NO:6, SEQ ID NO:12, SEQ ID NO:16, SEQ ID NO:18, SEQ ID NO:20, SEQ ID NO:22, SEQ ID NO:24, and SEQ ID NO:26;

(b) an LRP binding domain having the amino acid sequence of SEQ ID NO:10; and

(c) a linker connecting said Aβ binding domain to said LRP binding domain.

14. A nucleic acid molecule comprising a nucleotide encoding the anti-LRP-Aβ peptide of claims 12 or 13.

15. A nucleic acid molecule encoding an anti-LRP-Aβ peptide comprising:

(a) a region encoding an Aβ binding domain, comprising 30-150 contiguous nucleotides of SEQ ID NO:5; and

(b) a region encoding an LRP binding domain comprising 30-150 contiguous nucleotides of SEQ ID NO:7.

16. A nucleic acid molecule encoding an anti-LRP-Aβ peptide comprising:

(a) a region encoding an Aβ binding domain having a nucleotide sequence selected from the group consisting of SEQ ID NO:5, SEQ ID NO:11, SEQ ID NO:15, SEQ ID NO:17, SEQ ID NO:19, SEQ ID NO:21, SEQ ID NO:23, and SEQ ID NO:25; and

(b) a region encoding an LRP binding domain having the nucleotide sequence of SEQ ID NO:9.

17. A nucleic acid molecule encoding an anti-LRP-Aβ peptide comprising:

(a) a region encoding an Aβ binding domain having a nucleotide sequence selected from the group consisting of SEQ ID NO:11, SEQ ID NO:15, SEQ ID NO:17, SEQ ID NO:19, SEQ ID NO:21, SEQ ID NO:23, and SEQ ID NO:25; and

(b) a region encoding an LRP binding domain comprising 30-150 contiguous nucleotides of SEQ ID NO:7.

18. The nucleic acid molecule of claims 15, 16, or 17, wherein said region encoding said Aβ binding domain is connected to said region encoding said LRP binding domain by a phosphodiester bond.

19. The nucleic acid molecule of claims 15, 16 or 17, wherein said region encoding said Aβ binding domain is connected to said region encoding said LRP binding domain by a nucleotide encoding 1-20 glycine residues.

20. A nucleic acid molecule comprising, a polynucleotide having at least 95% homology to the nucleic acid molecule of claims 15, 16, 17, 18 or 19.

21. A nucleic acid molecule comprising, a first polynucleotide that hybridizes to a second polynucleotide, wherein said second polynucleotide is complementary to the nucleic acid molecule of claims 15, 16, 17, 18 or 19.

22. The nucleic acid molecule of claim 21, wherein said first polynucleotide hybridizes to said second polynucleotide under conditions comprising:

(a) incubating overnight at 42°C in a solution consisting of 50% formamide, 5x SSC, 50 mM sodium phosphate (pH 7.6), 5x Denhardt's solution, 10% dextran sulfate, and a 20 μg/ml denatured, sheared salmon sperm DNA; and

(b) washing at 65°C in a solution consisting of 0.1x SSC.

23. A nucleic acid molecule comprising a polynucleotide having the nucleotide sequence of SEQ ID NO:13.

24. A nucleic acid molecule comprising a polynucleotide having at least 95% identity to the nucleotide sequence of SEQ ID NO:13.

25. A nucleic acid molecule comprising a first polynucleotide that hybridizes to a second polynucleotide, wherein said second polynucleotide is complementary to the nucleotide sequence of SEQ ID NO:13.

26. The nucleic acid molecule of claim 25, wherein said first polynucleotide hybridizes to said second polynucleotide under conditions comprising:

(a) incubating overnight at 42°C in a solution consisting of 50% formamide, 5x SSC, 50 mM sodium phosphate (pH 7.6), 5x Denhardt's solution, 10% dextran sulfate, and a 20 μg/ml denatured, sheared salmon sperm DNA; and

(b) washing at 65°C in a solution consisting of 0.1x SSC.

27. A pharmaceutical composition comprising an anti-LRP-Aβ molecule, and one or more pharmaceutically acceptable carriers.

28. A pharmaceutical composition comprising the anti-LRP-Aβ peptide of claims 4, 5, 6, 7, 8, 9, 10 or 13, or a pharmaceutically acceptable salt thereof, and one or more pharmaceutically acceptable carriers.

29. A pharmaceutical composition comprising an anti-LRP-Aβ peptide having an amino acid sequence selected from the group consisting of SEQ ID NO:4 or SEQ ID NO:14, or a pharmaceutically acceptable salt thereof, and one or more pharmaceutically acceptable carriers.

30. A method of combating Alzheimer's Disease in a subject comprising administering an anti-LRP-Aβ molecule.

31. The method of claim 30, wherein said anti-LRP-Aβ molecule is a peptide.

32. A method of combating Alzheimer's Disease in a subject comprising administering the anti-LRP-Aβ peptide of claims 4, 5, 6, 7, 8, 9, 10 or 13, or a pharmaceutically acceptable salt thereof.

33. A method of combating Alzheimer's Disease in a subject comprising administering an anti-LRP-Aβ peptide having an amino acid sequence selected from the group consisting of SEQ ID NO:4 and SEQ ID NO:14, or a pharmaceutically acceptable salt thereof.

34. An *A2M-2* antisense oligonucleotide comprising a nucleotide designed to target *A2M-2* RNA.

35. The *A2M-2* antisense oligonucleotide of claim 34, wherein said RNA is hnRNA.

36. The *A2M-2* antisense oligonucleotide of claim 34, wherein said RNA is mRNA.

37. An *A2M-2* antisense oligonucleotide comprising a nucleotide having the sequence of SEQ ID NO:27.

38. An *A2M-2* antisense oligonucleotide comprising a nucleotide having the sequence of the last 15-30 contiguous nucleotides of SEQ ID NO:27.

39. An *A2M-2* antisense oligonucleotide comprising nucleotides 36 -50 of SEQ ID NO:27.

40. An *A2M-2* antisense oligonucleotide comprising nucleotides 20 -50 of SEQ ID NO:27.

41. A pharmaceutical composition comprising the *A2M-2* antisense oligonucleotide of claims 34, 35, 36, 37, 38, 39 or 40, and one or more pharmaceutically acceptable carriers.

42. A method of combating Alzheimer's Disease in a subject comprising administering the*A2M-2* antisense oligonucleotide of claims 34, 35, 36, 37, 38, 39 or 40.

43. A vector for gene therapy of Alzheimer's Disease, comprising a viral vector, wherein said viral vector carries a transgene selected from the group consisting of a gene encoding α_2M, and a gene encoding an anti-LRP-Aβ peptide.

44. The viral vector of claim 43, wherein said transgene is a gene encoding α_2M.

45. The viral vector of claim 44, wherein said transgene has the nucleotide sequence of nucleotides 44-4465 of SEQ ID NO:1.

46. The viral vector of claim 43, wherein said transgene is a gene encoding an anti-LRP-Aβ peptide.

47. The viral vector of claim 43, where in said transgene encodes the anti-LRP-AB peptide of claims 4, 5, 6, 7, 8, 9, 10, 12 or 13.

48. The viral vector of claims 43, 44, 45, 46 or 47, wherein said viral vector is an adeno-associated virus.

49. A pharmaceutical composition comprising the viral vector of claims 43, 44, 45, 46, 47 or 48, and one or more pharmaceutically acceptable carriers.

50. A method of combating Alzheimer's Disease in a subject by administering the viral vector of claims 43, 44, 45, 46, 47 or 48.

51. A method of screening for a therapeutic agent for Alzheimer's Disease, wherein said therapeutic agent is the agent of claim 1.

52. A method of screening for a therapeutic agent for Alzheimer's Disease comprising the steps of:

(a) incubating cells in the presence of a test agent, wherein said cells are heterozygous or homozygous for the *A2M-2* allele, and wherein said cells express *A2M-2*; and

(b) determining whether the ratio of normal to aberrant *A2M* mRNA has increased relative to the ratio of normal to aberrant *A2M* mRNA found in cells untreated with test agent.

53. The method of claim 52, wherein said cells are glioma cells.

54. The method of claim 52, wherein said cells are hepatoma cells.

55. The method of claim 52, wherein said cells are heterozygous for the *A2M-2* allele.

56. The method of claim 52, wherein said cells are homozygous for the *A2M-2* allele.

57. The method of claim 52 wherein said step (b) comprises S1 nuclease analysis using a probe complementary to SEQ ID NO:1, wherein said probe encompasses nucleotides 2057-2284 of SEQ ID NO:1.

58. The method of claim 57, wherein said probe is 300 bp long.

59. The method of claim 52, wherein said step (b) comprises S1 nuclease analysis using a probe complementary to nucleotides 2024-2323 of SEQ ID NO:1.

60. The method of claim 52, wherein said step (b) comprises RT PCR analysis.

61. The method of claim 60, wherein said step (b) comprises RT PCR analysis using primers designed to amplify a region of *A2M* encompassing exons 17-18.

62. The method of claim 61, wherein said region of *A2M* encompassing exons 17-18 is 300 bp long.

63. The method of claim 61, wherein said primers are designed to amplify nucleotides 2052-2289 of SEQ ID NO:1.

64. The method of claim 61, wherein said primers consist of a first primer having a nucleotide sequence complementary to nucleotides 2024-2038 of SEQ ID NO:1, and a second primer having the nucleotide sequence of nucleotides 2309-2323 of SEQ ID NO:1.

65. A method of screening for a therapeutic agent for Alzheimer's Disease comprising the steps of:

(a) incubating α_2M with a test agent; and

(b) determining whether said α_2M of step (b) has undergone a conformational change; wherein said steps are performed in sequential order.

66. The method of claim 65, wherein said step (b) comprises performing an α_2M electrophoretic mobility assay.

67. A method of screening for a therapeutic agent for Alzheimer's Disease comprising the steps of:

(a) incubating α_2M with a test agent; and

(b) determining whether said α_2M of step (b) can bind to LRP; wherein said steps are performed in sequential order.

68. The method of claims 65, 66 or 67, wherein said α_2M is tetrameric.

69. The method of claim 67, wherein said step (b) comprises performing an ELISA.

70. The method of claim 69, wherein said ELISA comprises the steps of:

(a) incubating LRP in a well coated with anti-LRP IgG;

(b) incubating said well with said α_2M;

(c) incubating said well with anti-α_2M IgG conjugated to an enzyme; and

(d) incubating said well with a substrate for said enzyme; wherein said steps are performed in sequential order.

71. The method of claim 69, wherein said ELISA comprises the steps of:

(a) incubating a well coated with LRP with said α_2M;

(b) incubating said well with anti-α_2M IgG conjugated to an enzyme; and

(c) incubating said well with the substrate for said enzyme; wherein said steps are performed in sequential order.

72. The method of claim 69, wherein said ELISA comprises the steps of:

(a) incubating said α_2M in a well coated with an anti-α_2M IgG specific for activated α_2M;

(b) incubating said well with said α_2M;

(c) incubating said well with anti-α_2M IgG conjugated to an enzyme; and

(d) incubating said well with a substrate for said enzyme;

wherein said steps are performed in sequential order.

73. The method of claim 67, wherein said step (b) comprises immunoblotting.

74. The method of claim 73, wherein anti-LRP IgG and anti-α_2M IgG are used to perform said immunoblotting.

75. The method of claim 67, wherein said step (b) comprises determining the ability of said α_2M to undergo LRP mediated endocytosis.

76. The method of claim 67, wherein said step (b) comprises determining the ability of said α_2M to undergo LRP mediated degradation.